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TECHNOLOGY DEPT.

# SCIENCE NEWS LETTER

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THE WEEKLY SUMMARY OF CURRENT SCIENCE • FEBRUARY 16, 1946

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A SCIENCE SERVICE PUBLICATION

1921 TWENTY-FIFTH ANNIVERSARY 1946

1846—GEORGE WESTINGHOUSE CENTENNIAL—1946

*And suddenly—a wonderland of light...*

It was an unforgettable sight that greeted the crowds at the Chicago Columbian Exposition, back in May, 1893.

For suddenly 250,000 incandescent lamps—more than there were in *all* the rest of *America* at that time—blazed in the night. They transformed the World's Fair Grounds into a gleaming wonderland of light.

George Westinghouse had done it again. Overcoming tremendous obstacles, he had accomplished the "impossible" . . . *in one short year.*

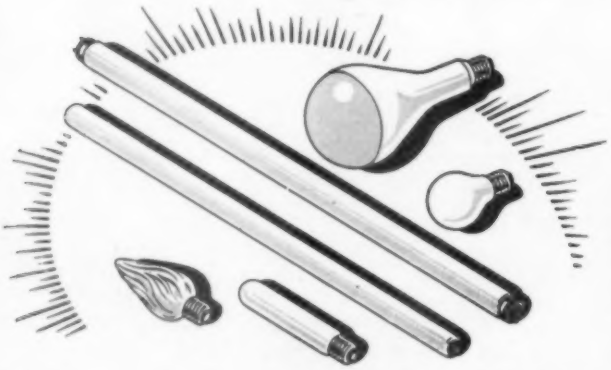
Using an entirely new principle, this great inventor-engineer had developed a completely *new type* of incandescent lamp—the famous "stopper lamp." And he had equipped a new glass factory to turn them out by the hundreds of thousands!

Here again, George Westinghouse in this historical light demonstration proved the vision and ability of a great engineer.

The lighting of the Columbian Exposition was a brilliant spectacle—and an important one, for it launched for all time the new age of electric lighting.

**Westinghouse**

PLANTS IN 25 CITIES OFFICES EVERYWHERE



***TODAY*** *— the Westinghouse Electric Corporation, one of many companies founded by this great inventor, makes incandescent lamps in all sizes, from tiny "grain of wheat" surgical lamps to high-power flood lights . . . fluorescent lamps that glow without flicker . . . high-intensity mercury lamps for industrial use . . . Sterilamps* that kill air-borne bacteria. In all, over 10,000 different types of lamps are made, each the result of skilled engineering—and over half a century of diversified experience.*

* Registered Trademark

*Tune in:* JOHN CHARLES THOMAS—*Sunday, 2:30 pm, EST, NBC* • TED MALONE—*Monday through Friday, 11:45 am, EST, American Network*

AERONAUTICS-METEOROLOGY

# All-Weather Flying

**The AAF now has facilities to maintain flying under all conditions of weather and visibility. Wartime developments may make it a postwar reality.**

► ALL-WEATHER FLYING, a dream of airmen since the first invention of flying machines, may become a postwar reality as American aviation uses and develops wartime discoveries in the fields of aircraft construction and aerial navigation.

Maj. Gen. Curtis E. LeMay, deputy to the commanding general of the Army Air Forces for research and development, has declared that the AAF now has facilities to maintain flying under all conditions of weather and visibility. To consider the feasibility of all-weather flying and discuss wartime developments in the field, the Army Air Forces invited military and civilian aviation experts to a week-long conference in Washington.

Though much research and inventive genius will be required before commercial airlines can run all-weather schedules, the war's discoveries point to the day when fog, wind, rain and snow will no longer ground flights. To the armed forces, all-weather flying would permit continuous flying operations and end the "scrubbing" of flights, as flyers in the war called their cancelled missions.

Wartime discoveries and inventions, picturesquely labelled with abbreviated names, will serve as the base from which American science can work toward all-weather flying. Radar, loran, shoran, and many other less-publicized instruments and systems that were vital to victory over enemies in war may bring peacetime victories over the forces of nature, the greatest enemy of continuous flight operations.

To demonstrate what can be done under the classic condition, "ceiling zero," the Army Air Forces have landed large planes with blindfolded pilots at the controls. Using a ground-controlled radar system, planes can be "talked down" to perfect landings by a control operator on the airfield.

Radar, most famous of the revolutionary aids to navigation produced during the war, is a radio transmitter and receiver unit sending out radio waves and reflecting them back to indicate surrounding objects for many miles. On his radar screen, the pilot may "see" his surroundings in the most blinding weather conditions.

Already, the Civil Aeronautics Administration has begun research to develop radar's use in peacetime aviation. Radar both on the ground and in the planes is the prospect for flying in the near future.

Similar to radar is a system for determining geographic position, loran. The loran system sends out radio pulses from fixed ground points that are picked up by receivers on planes. These receivers measure the time of arrival of the pulses from the known transmitting points, permitting the navigator to plot his position on special charts.

Because ground waves have a range only one-fourth as great over land as over water, a refinement in loran was necessary for overland flying operations. This development, SS Loran, uses waves from the loran transmitters that are reflected downward from the upper strata in the atmosphere.

In shoran, a short-range navigational aid used successfully in the bombing of Berlin and other German targets, a plane transmits two signals to ground stations. These signals, transmitted back to the plane, are computed by a special receiver that gives an accurate figure of the distance from the plane to the two stations.

Discoveries during the war relating to high frequency radio have already led to a definite plan for America's postwar airports. The Civil Aeronautics Administration has announced plans for a ground-to-plane, high frequency landing system to be installed at 12 major airports. The new system will permit faster landing schedules on airport runways in overcast weather.

Throat microphones, transmitting the vibrations of the larynx instead of the voice from the mouth, permit accurate communication in a plane under the most noisy conditions and will be a small but important contribution to flying under adverse conditions.

Whether all-weather flying becomes feasible soon or not, radar and related electronic equipment produced during the war are proving valuable in forecasting weather and predicting storms. Reconverted to peacetime use, the war's developments in aviation mean safer, more continuous flight operation pointed toward all-weather flying in the future.

*Science News Letter, February 16, 1946*

ASTRONOMY

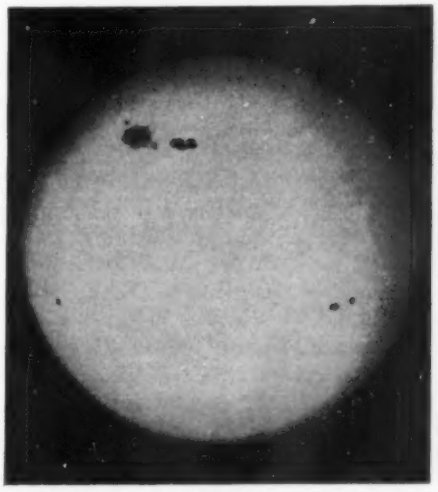
## Large Group of Sunspots Now Clearly Visible

► SUDDEN INABILITY either to send or receive shortwave broadcasts, experienced during the last week or two, may be blamed on a group of sunspots large enough to be seen plainly through smoked glasses.

The blackout of shortwave broadcasts was predicted when the group first appeared on the northeastern limb of the sun on Jan. 29. The worse magnetic disturbance occurred between five and six o'clock the morning of Feb. 7, according to radio experts at the National Bureau of Standards. At that time radio transmission began to deteriorate noticeably, followed by a complete blackout of messages from London, Berlin and Moscow.

On top of the magnetic storm was superimposed occasional sporatic disturbances. The exact time of these blackouts could not be predicted, but they occurred only during the hours when the path of the radio waves passed through a daylight zone.

*Science News Letter, February 16, 1946*



***CLEARLY VISIBLE—The spots in the upper right edge of the sun are large enough to be visible through smoked glasses or fogged camera film. They are the first large group since March, 1940, when seven spots appeared and radio, telephone and teletype communications were snarled for several days. Photograph by U. S. Naval Observatory.***

MICROSCOPY-BIOLOGY

# Movies of Cell Life

**Speeded-up motion pictures show repair of injured nerve fibers, rescue of "lost" blood corpuscles and other life dramas under the microscope.**

➤ MOTION PICTURES of the self-repair of injured nerve cells, the rescue of red blood corpuscles "lost" in body tissues outside their regular channels, and other intense little life dramas as seen through the microscope were shown before the University of Cincinnati chapter of the Society of the Sigma Xi, national science honor society, by Prof. Carl Caskey Speidel of the University of Virginia.

The pictures were made by the time-lapse or fast-motion method, in which one frame of the motion picture film is exposed every two, four or eight seconds. When the finished film is projected at normal speed of 16 frames a second, from a half-hour to two hours of life and action are compressed into a viewing time of one minute. Prof. Speidel first began work on his micro-motion films in 1932, and he now has a library of 10,000 feet of carefully selected and edited pictures, both colored and monochrome, covering a wide variety of biological subjects.

In the nerve-injury films, an anesthetized frog tadpole is held on a glass slide before the microscope, which is carefully focussed on nerves in its flat, transparent tail. Re-growth of fibers injured in various ways has been recorded. Of special value in medical work are pictures showing nerve self-repair after injury by the three "shock" methods used in the treatment of some forms of insanity: insulin, metrazol and electricity.

Sometimes, in connection with other types of injury, red blood corpuscles come out of the capillaries and become lost among the cells of other tissues. Helpless to get back into circulation themselves, yet too valuable to abandon, they are literally saved by the building of a rescue road. From one of the smaller lymph vessels, the body's auxiliary circulatory system, a short outgrowth pushes its way among the cells to the place where the lost corpuscles are. A channel develops down the length of the outgrowth, and through it the rescued corpuscles move back into circulation. If, however, they are so situated that they cannot be rescued in less than two days they have to be given up as lost, and what might be termed a burial party of white corpuscles makes its way out to them and disposes of them.

Several sequences in Prof. Speidel's films showed the complex process of mitosis or division in different types of animal cells, both under normal conditions and after injury by such medically important agencies as electric shock, mustard gas, sulfa drugs and starvation. These shots of cell life also included the last act of all, the death of the cell.

*Science News Letter, February 16, 1946*

MEDICINE

## Mouse Studies Suggest Polio Susceptibility

➤ SUSCEPTIBILITY to infantile paralysis, or polio as it is also known, is greater in summer because of the effect summer heat has on body chemistry, Dr. D. Frank Holtman, of the University of Tennessee suggests. (*Science*, Feb. 1).

His suggestion is based on studies of the effects of temperature on polio susceptibility in mice.

Mice acclimated to a temperature of 55.4 degrees Fahrenheit, and living in that temperature after inoculation with polio virus, never showed symptoms of paralysis in less than 11 days. Not until 13 days after inoculation had the mortality reached 50%.

In contrast to this, a group of mice adapted to a temperature of 71.6 degrees Fahrenheit had a 50% mortality at the end of seven days and a group of mice acclimated to a temperature of 89.6 degrees Fahrenheit began showing symptoms and dying as early as the fifth day.

Metabolism, that is, physical and chemical processes such as those involved in the conversion of food into tissues and energy, goes on at a faster rate upon exposure to cold and at a slower rate when the temperature rises. In view of this, Dr. Holtman believes his findings with the mice mean that the rapid growth of polio virus in the body and resulting symptoms of disease are dependent on a disturbance of the normal metabolism of the body, such as that occurring in humans living in the temperate zone when the temperature shifts from the cool temperatures of spring to the heat of summer.

The same explanation holds good for the fact that children in the five- to nine-year age group are most often attacked by polio. This age, Dr. Holtman points out, is the period when the rate of metabolism is declining rapidly, after reaching a peak at about the age of five.

*Science News Letter, February 16, 1946*

*Succulent plants,* particularly lilacs, and certain cut flowers can be kept fresh for many extra hours by a vacuum treatment in which air in the plant tissues is replaced by water.

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NUTRITION

# Fewer Vitamins in Bread

**Dozens of problems will result from changing our basic flour to help feed Europe. It may be necessary to add calcium, and we will get fewer calories.**

➤ IN CHANGING our basic flour to help feed starving Europe, dozens of problems are presented to millers, bakers, nutritionists and housewives of America.

Fewer vitamins from our daily bread as well as fewer calories may be one result. Our present enriched white bread made from 72% extraction flour supplies about twice as much thiamin, or vitamin $B_1$, and pellagra-preventing niacin and probably more of another vitamin, riboflavin, as the new 80% extraction flour will. The 80% flour of course could be enriched but that may bring fresh problems, both legal and technical.

The nation's nutrition authorities apparently were not consulted about this move as they were on food and nutrition problems during the war. Some are worried over whether we shall lose the benefits of the flour enrichment for which they fought long and hard. Nutritionists and home economics experts of the Department of Agriculture reviewing the nation's nutritional status just before the Truman order were pointing out that Americans do not yet eat enough of the foods that make for an adequate diet. A statement prepared a few days before and released to the press on the same morning as the President's order states:

"Families with very low incomes may run short on calories as well as on the important minerals and vitamins."

Besides concern over the vitamin content of the new flour, nutritionists wonder whether it will be necessary to add calcium to it. In Britain during the war this was done with the 85% flour. The reason was that the 85% flour, and possibly 80%, contains a certain amount of phytic acid. This chemical combines with calcium and has a decalcifying effect on the bones and teeth, especially in children. To avoid this danger, the British added calcium to their 85% wartime flour.

Another question is whether Americans will eat as much bread when made of 80% flour. If they do not, there may be more flour for starving Europe but Americans will be getting less than the expected amount of calories.

Southerners who eat much of their bread in the form of biscuits and hot bread will find difficulty in baking these from 80% flour.

Digestive difficulties, though perhaps of a minor nature, may be experienced by some who eat bread from the new flour. This was the case in Britain during the war, though other features of the British wartime diet may have contributed.

One advantage of the 80% flour might be its slightly greater content of protein. The protein might also have a different biological value tending to make it more nutritious.

Saving in wheat without too drastic change in milling processes might be achieved, it has been suggested, by requiring distribution of an average 80% flour. This could be accomplished by requiring purchasers to take part of their flour in the present 72% extraction form and part of it in the form of darker flour or bran. Reducing the amount of flour allowed to consumers by rationing at least as far as the retailers is seen as another way of saving wheat without changing the flour.

*Science News Letter, February 16, 1946*

ELECTRONICS

## Electron Microscope Developed in Russia

➤ SOVIET ELECTRON microscopes, one developed during the war and used in war work, and an ultraviolet microscope, both designed at the Soviet State Optical Institute, were described at a recent meeting of the Academy of Sciences in Moscow, at which special tribute was paid to 80-year-old Soviet agrochemist, Dmitri Prianishikov, and to 75-year-old Alexander Baikov, distinguished Soviet metallurgist.

The importance of physics, chemistry and technology, as distinguishing features of present scientific development, was emphasized in various papers presented at the meeting. The highlight, however, was Alexander Lebedev's paper which reviewed the development of the electron microscope.

***SAVES TIME—A new electronic computing device known as the Antennalyzer, developed at RCA Laboratories, solves the problems of locating and arranging new antennas in a matter of minutes compared to weeks of surveys and calculations heretofore necessary. Readings taken from the final dial settings tell engineers where to locate the antenna towers in order to direct maximum power in desired directions.***

The staff of the Optical Institute, he said, designed and built an electron microscope in 1940 that magnified objects 10,000 times. An improved model built at the end of the war magnifies 25,000 times, and one twice as powerful will be ready for use in the near future.

The ultraviolet microscope was described by E. Brumberg, its designer. It is extremely sensitive, he said, and will detect the presence of infinitesimal quantities of many substances.

Another scientist discussed substances with high and superhigh dielectric conductance, and described what he called a new material, titanite of sodium, which, he said, possesses high insulating and magnetic properties.

*Science News Letter, February 16, 1946*

The *Alaska peninsula,* that stretches along the arc of the Aleutian islands, was once a series of islands but the channels between them silted up through the action of shorewise currents and ash from active volcanoes.

CHEMISTRY

# Aids for Brain Study

**May yield some of the secrets of its functioning to "tracer" experiments with the radioactive by-products of atomic research.**

➤ THE BRAIN, which is probably the most impervious to study of man's organs, may yield some of the secrets of its functioning to "tracer" experiments with radioactive by-products of atomic research.

Scientists in the University of California Medical School have already conducted experiments with radioactive phosphorus produced in the Berkeley cyclotron. Radioactive sodium and potassium also show promise of being useful tools in the study of the brain.

While the work is just beginning and it is too early to speculate on results the scientists believe the "tracer" studies hold the greatest promise in studying abnormal conditions of the brain, such as epilepsy.

"Tracer" studies are made possible by the radioactivity of various isotopes, or sisters, of common elements.

A radioactive isotope of phosphorus, for example, cannot be distinguished from ordinary phosphorus, except by its radiations. In the human body it acts like ordinary phosphorus. However, the presence of an atom of radio phosphorus anywhere in the body can be detected recording its radiation on delicate instruments.

Thus the metabolism of radio elements in the brain can be determined by the "tracer" method.

The importance of learning more about the functioning of the brain is evident from figures on epilepsy alone. It is estimated that over half a million people have convulsions in the United States alone, a figure approximating the number who have active tuberculosis.

While more has been done in the study and treatment of the disease in the past 10 or 15 years than in all previous history, there is still little understanding of the biochemical basis of the convulsive state. Epilepsy, therefore, remains largely a mystery.

*Science News Letter, February 16, 1946*

CHEMISTRY

# Molecules Reveal Secrets

**Great advances in medicine and biology to come from study of sizes and shapes of molecules. Specific action of drugs explained by configuration.**

➤ GREAT ADVANCES in fundamental biology and medicine will come from thorough investigation of the sizes and shapes of molecules of body chemicals and of drugs and germ-killing chemicals, Dr. Linus C. Pauling, director of the Gates and Crellin Laboratories of Chemistry of the California Institute of Technology, declared at a meeting of the American Chemical Society in Rochester.

Antibodies, substances formed in the body to fight invading disease germs, are protein chemicals with very large molecules, Dr. Pauling pointed out. They react with the antigen of a disease germ or with a protein substance like egg white to form a precipitate in the same way that many of the ordinary precipitates the chemist meets in his work are formed. Dr. Pauling gave as an example the precipitate formed by a solution of a silver salt with a solution containing a cyanide ion. The antibody-antigen precipitate, moreover, can be redissolved by addition of an excess of antigen just as the silver cyanide can be by an excess of cyanide ion.

The great specificity of interaction between antibodies and antigens, each antibody reacting only with its corresponding antibody, is like another familiar chemical process, the formation of a crystal of a substance from a solution, Dr. Pauling pointed out.

After the antigen is injected into the body, antibody molecules are formed in such a way that a region of the antibody takes a configuration that mirrors a portion of the surface of the antigen molecule.

"This complementariness in structure leads to a strong attraction between the antibody molecule and the antigen, because it permits this combining region of the antibody molecule to get into close contact with the antigen molecule," Dr. Pauling said. "The closer that the two molecules can get in contact with each other, the stronger the intermolecular force of attraction between them.

"A crystal of a molecular substance is stable because all of the molecules pile themselves into such a configuration that each molecule is surrounded as closely as possible by other molecules; that is, if a molecule were to be removed from the interior of a crystal, the cavity that it would leave would have very nearly the shape of the molecule itself. Other molecules, with different shape and structure, would not fit into this cavity nearly so well, and in consequence other molecules in general would not be incorporated in a growing crystal."

"The specific action of drugs and bactericidal substances," he said, "has a similar explanation. Even the senses of taste and odor are based upon molecular configuration rather than upon ordinary chemical properties—a molecule which has the same shape as a camphor molecule will smell like camphor even though it may be quite unrelated to camphor chemically."

*Science News Letter, February 16, 1946*

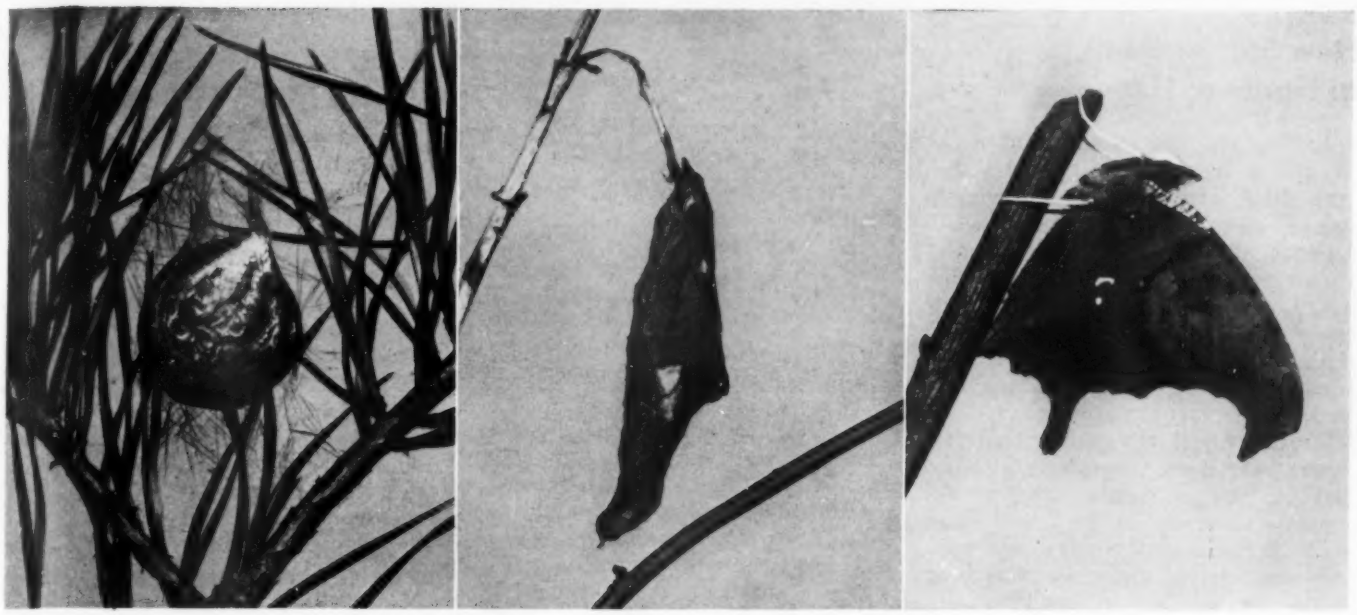
ENTOMOLOGY

## Insects Hide in Woods During Winter Season

➤ WINTER finds the woods quiet and still, deprived of the cheerful humming and buzzing of an active insect world. Safe in a silken sleeping bag or protected by a water-proof varnish, hidden under loose bark or cozy in tunnels chewed in rotting wood, insects pass the freezing days in a state of complete inactivity. As eggs, larvae, pupae or even adults, they await spring with its flowers and warm weather.

A slight swelling on a twig may be the winter quarters of hundreds of insect eggs. The mother lackey moth, for instance, binds her eggs in bracelets around a twig and covers them with a gum that hardens into a protective crust. A shiny coat of glandular shellac the same color as the twig protects the eggs of the Eastern tent caterpillar against weather and other enemies, until the caterpillars are ready to emerge in April.

Some insects pass the winter as larvae, hidden under stones or tunneled deep



*WINTER HABITS—Baby spiders will begin to emerge in the early spring from the silken cocoon, left, which protects the eggs against the winter's cold. Next is the cocoon of the Promethiea moth. The violet-tip butterfly, right, spends the winter as an adult clinging to the stalk. Photographs by George A. Smith of Quarryville, Pa.*

within the wood of a tree. A winter sleeping bag of chewed wood held together with a little silk protects the larvae of the goat moth, while the larvae of the ghost moth lies in a silk-lined bed.

Cocoons house quiescent pupae or chrysalids, the last stage before the insects are ready to leave in their adult form. The pupae of many beetles lie in gum-varnished or silk-decorated chambers bored in a tree. The larvae of some moths make an earthen cell in the ground and pupate there.

Some cocoons, an uninteresting brown, are passed unnoticed amid the leaves. Others are encased within curved leaves, pulled around them with silken threads. The swaying cradles of the bagworm, made in this way, are bound to the twig for security by a silken thread. A two-layered cocoon, with an air space between to protect the pupa from sudden changes in temperature, is built by the Cecropia silk moth.

Some insects survive the winter in their adult state. The young queen of the bumblebee may lie as an adult hidden deep in a mossy bank. A piece of rotten wood knocked out of place may reveal beetles that scramble quickly out of sight.

Spiders, as well as nearly all insects, hibernate in cold weather. Trap-door spiders seal the doors of their burrows with silk or place a piece of their building material across the door. Silken cases attached to the underside of stones or pieces of loose bark house other spiders. Some spiders pass the winter as eggs, protected from the cold by a silken cocoon spun by the mother spider in the late autumn before the winter's cold overcomes her.

*Science News Letter, February 16, 1946*

PHYSIOLOGY

## Conditioned Dog's Heart Beats Faster

► WHETHER, like the soldier in the song, he wanted to murder the bugler and spend the rest of his life in bed, is not told, but a dog in the Institute of Experimental Medicine in Leningrad was conditioned to have his heart beat faster and his blood pressure rise when he heard the sound of a trumpet call, states a report received from the Soviet Scientists Committee in Moscow.

For this and other studies demonstrating the conditioned reflex theory of Pavlov, Prof. Konstantin Bykov, a pupil of Pavlov's, has been awarded the Stalin Prize.

The dog was conditioned by having adrenalin injected into a vein at the same time that a trumpet was blown. Adrenalin, also called epinephrine, is a product of the adrenal glands which stimulates heart activity and raises blood pressure. After several simultaneous trumpet blowings and adrenalin injections, the trumpet was blown when adrenalin had not been injected. The dog's heart nevertheless began to beat faster and his blood pressure increased.

*Science News Letter, February 16, 1946*

RADIO

## Radio Amateurs Report First Use of Microwaves

► RADIO AMATEURS have made contacts over a range of 31 miles in the first use of super-high frequency microwave bands outside of military and commercial tests.

A. E. Harrison, W6BMS, and Reuben Merchant, W2LGF, both of the Sperry Corporation, New York, tested the new bands shortly after the Federal Communications Commission released them to amateur radio operators. They first made contact at five miles and later reached 31 miles.

Microwaves, used in wartime radar, are found in super-high frequencies that have not been open to amateur radio operators before. Limited in distance, microwave beams are narrower than ordinary waves and permit use of smaller antennae and directional equipment not practical at lower frequencies.

Messrs. Harrison and Merchant used the 5250 to 5650 megacycle band in their first experiments with the super-high frequencies.

*Science News Letter, February 16, 1946*

ASTRONOMY

## New Star Visible In Northern Heavens

➤ LOOK IN THE northern heavens to see a new exploding star that burst forth early on the morning of Feb. 9. The famous nova of 1866, T. Coronae Borsalis was in intervening years a tenth magnitude star, far below naked eye visibility. Suddenly it increased in brightness many hundred times, reaching a magnitude of three and two-tenths, Dr. Armin Deutsch of Yerkes Observatory, discovered.

The discovery, reported by Dr. Otto Struve of Yerkes Observatory, showed that this star, a faint member of the constellation of the northern crown, had again become a nova. Study of the star's spectrum betrayed that it was expanding at the rate of 2500 miles (4000 kilometers) a second.

Astronomers will follow the star closely to discover why stars not only suddenly increase in brightness, but do so more than once. There are several other recurrent novae on record, including T Pyxidis, which burst forth for the fourth time in 1943.

*Science News Letter, February 16, 1946*

MEDICINE

## A-Bomb Tracer Chemicals Used in Medical Research

➤ ATOMIC "TRACER" research indicates that carbon monoxide cannot be utilized by the human body in combination with oxygen to form carbon dioxide.

The research, performed by the University of California Aero-Medical Unit and recently removed from the war secrets list, was done with radioactive carbon monoxide produced in the 60-inch Berkeley cyclotron.

Purpose of the experiments was to determine whether the safe level of carbon monoxide in airplane cockpits, tanks, etc., could be changed in favor of higher tolerance. The research did not indicate this could be done.

Human subjects were allowed to breathe radioactive carbon monoxide followed by 100% oxygen. A bag containing soda lime was then placed over their mouths. In the event carbon monoxide was combined with oxygen to form carbon dioxide, the radio carbon in the latter would be collected from the breath in the lime.

Only a negligible quantity of radio carbon was collected, so little in fact that it indicated no carbon monoxide was utilized in the formation of carbon dioxide.

Short-lived radioactive carbon, known as Carbon 11, was used in the experiments. This isotope of carbon has a half-life of only 21 minutes, allowing experimenters only a few hours to work with it.

The researchers are withholding final judgment on the formation of carbon dioxide until experiments can be done with long-lived radioactive carbon, known as Carbon 14. With this isotope, long and complicated experiments can be done.

The research was done by Dr. John Lawrence, who was head of the Aero-Medical Unit and who has returned to peacetime research as head of the biological research program in the Berkeley radiation laboratory, and Dr. Cornelius Tobias, a member of the laboratory staff. Dr. Joseph G. Hamilton, of the radiation laboratory, prepared the radio carbon monoxide. The work was done under an OSRD contract.

*Science News Letter, February 16, 1946*

PHYSICS

## Submerged Submarines To Have Communication

➤ SUBMARINES of the future may receive orders from distant land bases and sent reports of their operations while submerged, says D. W. R. McKinley, a Canadian physicist of the Radio Branch, National Research Laboratories. (*Canadian Journal of Research*).

Mr. McKinley reports investigations that show transmitting stations radiating many thousands of watts of power should be able to send signals to submerged craft many hundreds of miles away. He adds that the undersea craft should be able to send back signals from below the surface of the water.

The Canadian investigator declares that the use of electromagnetic radiation by airplanes as a sort of "underwater radar" for locating submerged submarines is not practical. But he finds that a land station, such as that at Rugby, England, radiating 500,000 watts, should be able to send signals that could be detected by a submarine 1,000 miles at sea.

Development of communications with undersea craft, combined with discoveries permitting submarines to remain underwater for longer periods, may make possible huge undersea fleets operating in conjunction with surface ships.

*Science News Letter, February 16, 1946*

# IN SCIENCE

CHEMISTRY

## TB Germs Killed By Mold Products

➤ TUBERCULOSIS germs from patients in far advanced stages of the disease have been killed by a chemical extracted from mold, Dr. Isadore E. Gerber and Milton Gross, of the Hudson County, N. J., Tuberculosis Hospital report (*Science*, Feb. 8).

The mold substance is called mycocidin. It was obtained from a mold belonging to a group of *Aspergillaceae*. Whether it will ever become a remedy for tuberculosis is not indicated in the scientific report.

Growth of the disease-causing TB germs in glass tubes was completely checked by mycocidin. Germs that had been exposed to mycocidin in these tubes were injected into guinea pigs in amounts that ordinarily would cause fatal tuberculosis in the animals. The animals remained well and at death showed no signs of tuberculosis.

The activity of mycocidin against other kinds of disease germs is being tested and efforts are being made to obtain it in pure form.

*Science News Letter, February 16, 1946*

CHEMISTRY

## Vitaly Khlopin Receives 200,000 Ruble Award

➤ THE FIRST CLASS Stalin award of 200,000 rubles has been made to Vitaly Khlopin, member of the USSR Academy of Science and director of its radium institute, in recognition of his contributions to the science of radioactivity. Dr. Khlopin is internationally known for his research work in the chemistry of radioactive substances and in the use of radioactive preparations as applied in the medical field.

The Radium Institute of the USSR Academy of Science is now one of the world's most progressive institutions in which radioactive phenomena are studied. Its work under Academician Khlopin has greatly influenced the development of the radium industry in the Soviet Union, which uses home-produced raw material.

*Science News Letter, February 16, 1946*

# E FIELDS

ZOOLOGY

## Dozen Dwarf Chameleons At Zoo in Washington

See Front Cover

➤ A DOZEN DWARF chameleons from North Africa, guaranteed to keep up with any color changes except those of a Congressman's mind in election year, have been received at the National Zoological Park in Washington, D. C. They are among the rarest of lizards, and have never before been represented in the collections at this zoo. Among their other peculiarities is the fact that they bring forth their young alive instead of laying eggs—a rather unusual thing among lizards. One of the lizards is shown in the photograph by Fremont Davis, Science Service staff photographer, on the front cover of this SCIENCE NEWS LETTER.

Along with the North African specimens came some from South Africa—half-a-dozen spiny-tailed lizards.

From West Africa came a gift of half-a-dozen assorted specimens of the world's deadliest serpents: two African cobras, two rhinoceros vipers and two Gaboon vipers. With these were two burrowing pythons, which are non-poisonous constrictor snakes, and one broad-nosed crocodile. All these were collected and sent to Director William M. Mann by Forest Officer G. S. Cansdale, of the Gold Coast.

The two pythons are in a way the most interesting specimens in the lot, Dr. Mann stated. They do not have tapering tails like most snakes, so that they are sometimes called stump-tailed pythons. So blunt are their tails that it is not easy to tell at a glance which end of the snake the head is on.

*Science News Letter, February 16, 1946*

AERONAUTICS-CARTOGRAPHY

## Aeronautical Maps Will Be Of the American Type

➤ NEW AERONAUTICAL maps of much of the world will be of the American type, using the same symbols and color markings, the Civil Aeronautics Administration has announced. It was decided also at an international meeting in Montreal, CAA says, to base the World Aeronautical Charts on the standard American one-to-a-million-scale military aviation chart.

The use of these familiar symbols and color markings will be helpful to American pilots flying abroad. Flyers of many Allied countries have used or are familiar with American type aeronautical maps. This fact makes their worldwide adoption logical.

Some changes will be necessary, Kenneth Keefe of CAA states, to meet special conditions found outside the United States, and were agreed upon at the international meeting. For example, he said, forest areas in England and much of Europe are sharply defined and permanent. Therefore the meeting recommended use of green to show these wooded areas on European charts, whereas green will continue to symbolize land areas close to sea level on most charts of this hemisphere.

Towns marked with their names on roofs or other conspicuous spots will have their names underlined, Mr. Keefe explained, with magenta on the world air maps. Markers outside of town limits will be indicated by an "M" in a square.

*Science News Letter, February 16, 1946*

ZOOLOGY

## Small Sand Crabs Devour Stranded Jellyfish

➤ SMALL SAND CRABS that live in millions in the beaches of Hawaii help keep the shoreline tidied up by devouring the dead bodies of stranded Portuguese men-of-war, which are a peculiar type of jellyfish that drift in countless numbers on the ocean surface in the warmer parts of the world. Dr. David D. Bonnet of the University of Hawaii tells of this peculiar feeding habit of the sand crabs in *Science* (Feb. 1.)

He discovered it in the course of an investigation of the Portuguese men-of-war, which are nuisances to bathers because of the painful stings they inflict on contacting living flesh. Their stranded bodies seemed to be much less numerous than should have been expected. On seeking the cause for this disappearance, he found it was due to the sand crabs. These small crustaceans automatically provide burial for the jellyfish, because they habitually remain buried in the sand themselves, with only their tiny eyes showing, and they feed on the Portuguese men-of-war, which seem to constitute their only food, by "eating up at them" from underneath.

*Science News Letter, February 16, 1946*

ASTRONOMY

## Faint Comet Discovered At Vatican Observatory

➤ A NINTH MAGNITUDE comet was discovered in the constellation of Ursa Major, the great bear, on Feb. 2 by M. Timmers of the Vatican Observatory. The newly discovered comet may be seen throughout the next few months by those who search for it with a small telescope.

The comet is not expected, however, to become brighter than the eighth magnitude. Although it will be nearest the sun about April 18, it is at present as close to the earth as it will ever get.

On Feb. 21 the comet is expected to have a right ascension of 9 hours 1 minute, and a declination of 61 degrees 49 minutes. This position was calculated by Dr. Leland E. Cunningham of Aberdeen, Md., who received reports of observations of the comet from Yerkes Observatory of the University of Chicago, Lick Observatory of the University of California, and Lowell Observatory at Flagstaff, Ariz.

On March 1 the comet's right ascension is predicted to be 8 hours 30.3 minutes and its declination 67 degrees 37 minutes. Around May 10, when it will be in the vicinity of the North Star, the comet will have probably faded to eleventh magnitude.

*Science News Letter, February 16, 1946*

CHEMISTRY

## Durable Glazes on Chintz Developed with Resins

➤ DURABLE GLAZES on chintz, cotton fabric printed with colored designs, can be obtained through the use of relatively new resins developed by the American Cyanamid Company's textile resin division. Chintzes treated with the resin can be washed without loss of glaze, and also without noticeable shrinkage because the new finish greatly limits shrinking.

The resins are melamine formaldehyde compounds. Through their use it is now possible to obtain high-gloss glazes that will withstand boiling for a half hour in soapy water, it is claimed, and which are also immune to dry cleaning processes. Another important effect of the treatment with melamine resin is to limit the shrinkage to less than 2% in length or width. Melamine resin treatments are used also for controlling the shrinkage of wool fabrics.

*Science News Letter, February 16, 1946*

ENGINEERING

# Engines of the Future

**Turbine, rocket motors developed during the war for fighting planes will power transports of tomorrow and give America the speed it craves.**

By A. C. MONAHAN

➤ NEW ENGINES developed for fighting planes during the war will power transports of tomorrow and give air-minded America the speed it craves. They include the gas-turbine, father of the jets — turbojet, motorjet, ramjet, pulsejet, turboprop and turbofan—and several types of rocket motors.

Speed means high-altitude flying, even at heights way above the atmosphere surrounding the earth. Ordinary jet planes operate only in the oxygen-bearing air. Rocket motors can operate above the air because they carry their own oxygen for fuel needs.

Low-altitude aircraft in the future may use gas-turbines operating propellers, or they may continue to use the conventional reciprocating engine with its pistons pumping forward and back inside explosion chambers called cylinders. Some planes may be equipped with propellers for low flying and jet propulsion for high altitudes. In fact one installation, the propjet, has already been built and tested that operates propellers when desired and gives jet propulsion at will.

The gas-turbine is not a jet-propulsion engine but from it the jet engine of today was developed. It rotates a shaft which turns ordinary giant fan-like propellers just as does the reciprocating engine. But all moving parts in it move constantly in the same direction, thus eliminating vibration. Also it is a light and powerful unit.

### Similar to Steam Turbine

Gas-turbines are somewhat similar to the well-known and long-used steam turbines in which high-pressure steam escapes through many fan-like blades or vanes mounted on a drum, causing them and the drum to rotate at high speed.

In the steam turbine, fuel is burned to generate the steam. In the gas-turbine, fuel oil is burned at nozzles, making a rapidly expanded gas that passes directly through the hundreds of vanes on the turbine, imparting to the drive shaft a rapid and powerful rotation.

The principle of the gas-turbine has been known for years, but the development of a successful engine of this type had to await the development of alloy metals that would stand up while operating red hot. Gas-turbines reach their greatest efficiency only at extreme heat. Alloy metals to stand this heat were found in developing turbo-superchargers to supply conventional engines with sufficient atmospheric oxygen at high altitudes.

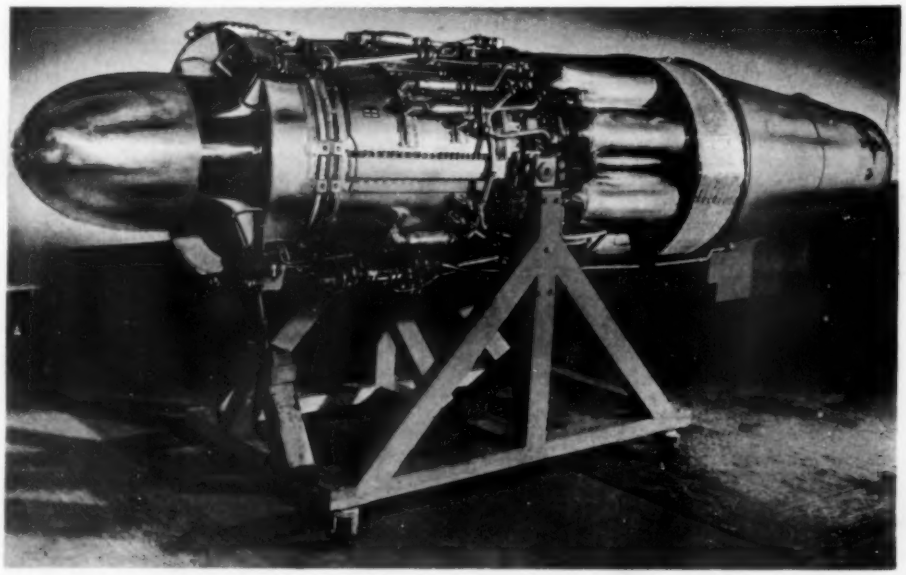
The principle behind jet propulsion is easily understood. First, it is *not* the result of a blast of hot gas pushing against a cushion of air behind the plane, as is commonly supposed. It is the result of a rapidly created gas, seeking room to expand, pushing against the forward end of the combustion chamber in which it is created. If it depended upon pushing against air behind it, jet propulsion would be inefficient in thin air and rockets could not travel above the atmosphere.

Imagine a cyclinder with very strong walls through which a spark plug is inserted, as in an automobile, and within which atomized gasoline and air are confined. By means of the spark plug and an electric spark, the gasoline is exploded. That means that it is almost instantaneously burned, uniting chemically with the oxygen in the enclosed air and forming a gas that normally requires much more space than there is within the cylinder. The newly-formed gas remains under a heavy compression and would burst the cyclinder if it was not very strong. It exerts a heavy but equal pressure on every square inch of its confining walls.

Now suppose the cylinder has a small opening at one end, and the sudden pressure is created. At the hole there is no wall for the gas to press against, so instead of equal pressures on the two ends, one has a pressure approaching zero. The pressure on the other end tends to force the cyclinder to move in its direction.

"Jet propulsion is in its infancy despite the fact that this war has evolved six distinct methods of utilizing atmospheric oxygen for propulsion," says Gen. H. H. Arnold in his recent report as commander of the Army Air Force. The names of the six are included in the list given above.

The motorjet is a reciprocating engine plus a ducted fan. The turboprop is a



***FOR SPEED—Streamlined like a torpedo, this new engine for jet propulsion, developed by General Electric, will speed planes well in excess of 500 miles an hour.***

gas-turbine plus propellers. The turbofan is a gas-turbine plus a ducted fan. The turbojet is a gas-turbine plus jet. The ramjet gives a continuous jet with compression by an aerodynamic ram, and the pulsejet is an intermittent jet.

The pure jet-propusion engine utilizes no whirling propellers. It is the engine of the new Army plane, the P-80 Shooting Star, built by Lockheed. The engine is a product of General Electric, and is said to be the simplest, most easily maintained, and one of the most powerful aircraft engines ever built.

The Shooting Star can operate only within the atmosphere as air is required for its engine. The air enters near the front and is compressed by a high-velocity blower which forces it into the combustion chamber. There it mixes with the kerosene fuel, which is injected at high pressure, and combustion takes place. The mixture is burned in a continuous explosion heating the gases and expanding them violently.

These gases rush to the rear and escape through jet nozzles, passing en route through the vanes of a gas-turbine wheel imparting high velocity to it. The turbine operates the compressor blower for the compression of the incoming air.

### Simple Ignition System

There is no complicated ignition system in the engine. A spark plug sets off the initial explosion, but once the engine is started a small glow plug becomes white hot and continuously ignites the fuel and air mixture.

Streamlined like torpedoes, the newest of turbojet engines, designed for speedy long-range flights, will fit more snugly into the wings of a plane than any powerful reciprocating engine. They are the axial flow type, with their principal units in a direct line.

In operation, air rams into the relatively small diameter axial flow compressor, and, after compression, is forced almost in a direct line back into combustion chambers. The gases resulting from combustion are expanded through the buckets of a turbine, then pass out through the jet exhaust to furnish the reaction to drive the plane.

Rocket motors can operate above the atmosphere because they carry their own oxygen and are independent of a supply from the air. They carry it, not as compressed oxygen in tanks, but in oxygen-yielding chemical compounds, known technically as oxidizers, mixed with the fuel. The mixture burns with sufficient rapidity to give high velocity to the escaping gas. In some cases the fuel and oxidizer are mixed before use and are made in the form of "grains." A grain is an extruded stick, made from a paste-like mixture and may be several feet in length. Grains must be free of flaws or air pockets to insure an even rate of combustion. In plants where they are made they are examined by X-ray equipment to make certain that they are flawless.

### Powered Robot Bombs

The jet-reaction engine known as the liquid-propellant rocket motor is the type that powered German V-2 robot bombs in the last days of the European war. It utilizes a liquid fuel injected as used into a combustion chamber, and for this reason, its operation cannot be compared with the powder- or solid-propellant rocket motor whose entire charge of fuel is lodged in the combustion chamber.

The liquid-propellant rocket motor can be repeatedly operated for long periods of time by merely replenishing the fuel and oxygen-carrying compound. Basically it consists of an injector somewhat similar to the carburetor in an automobile reciprocating engine, a combustion chamber, nozzle and a cooling jacket. The injector is made up of two chambers, one to feed the oxygen-carrying compound, the other to feed the fuel which may be any hydrocarbon.

A new experimental engine, claimed to be the smallest engine in the world today, was demonstrated recently in America by its inventor, a Polish scientist and rocket expert. It is a ramjet motor of a new and unusual design. It was designed to help launch gliders into the air.

This new engine consists of a cylindrical tube, which appears to be just a pipe, mounted on a restraining structure which has a free moving arm to permit the engine to swing in a circle around it when in operation.

The tube has a lining, a topless cone in shape, which opens from a smaller diameter in the front end to a larger diameter at the other. The space between the lining and the outer wall contains the gas which runs into a nozzle at the forward end of the cylinder. Air mixes with the gas coming through the small holes of the nozzle and combustion then takes place, thus providing the force of propulsion.

Gas-turbine engines driving propellers will replace conventional reciprocating airplane engines in all planes designed to travel at speeds under 500 miles an hour and at altitudes less than some 30,000 feet, predicted Hall H. Hibbard of the Lockheed Aircraft Company recently.

For higher speeds, he said, speeds of from 500 to 1500 miles an hour, pure jet engines without propellers will be used. With rocket engines, fighters and bombers of future years will be able to fly above the earth's atmosphere at practically any speed desired.

*Science News Letter, February 16, 1946*

*". . . from classical concepts to ATOMIC REALITIES."*

**PHYSICS *of the* 20th CENTURY**

**by Pascual Jordan**

*Translated by Eleanor Oshry*

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## Do You Know?

Some *bacteria* are 25% sulfur.

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*Kingbirds,* which grow to be eight inches long, can see insects 170 feet away.

New *silicone greases* are claimed to be ideal for permanent lubrication of ball bearings.

Wood of the *poplar tree* is widely used in making berry boxes and fruit baskets because it is soft, tough, clear, tasteless and odorless.

*Allspice,* technically pimento in Jamaica from which it comes, got its name because it has a flavor similar to a mixture of cinnamon, cloves and nutmeg.

If you want to keep *fishworms* in captivity put them in a wash-tub filled with a half-and-half mixture of rich earth and dried coffee grounds; a pound each of vegetable shortening and corn meal will feed 5,000 for a month.

*Fossils* of 28 different kinds of previously unknown animals recently unearthed in Colombia, now at the University of California, include an animal which had habits like a wolf but which was a marsupial, the family of the kangaroo and opossum.

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ELECTRONICS

# Improved Radar

**New especially designed ground-based and airborne equipment and land-based long-range radiobeacons proposed to make commercial flying safer.**

➤ IMPROVED ground-based and airborne radar equipment, especially designed for the purpose, and a network of land-based long-range radio-beacons were proposed as means of making commercial flying safer by Henry Busignies of the International Telephone and Telegraph Corporation. He described what he termed a radical new system of airport traffic control and navigation along airways, called "Navar," and a proposed worldwide system of long-range radiobeacons called "Navaglobe" for short.

The proposal was made at the week-long Army-sponsored conference in Washington, D. C., attended by military and civilian aviation experts, at which technical systems of making all-weather flying safer are being discussed.

The navar system, he stated, would project an electronic "moving picture" on a chart in the airport control center, showing the location and identity of every plane in the sky within 80 miles of the airport.

Navar, developed by Mr. Busignies, is, he said, an application of most of the types of radar proved during the war. In addition to the constantly moving radar picture in the ground-based control room, the pilot of a navar-equipped plane will see on his own radar scope his own and all other aircraft near his position and altitude, in relation to each other and to the ground, in one map-like indication, he stated.

The ground radar installation will show the planes in the area on three scopes, Mr. Busignies explained, each scope covering a certain category of aircraft. "Member" planes, he said, are those equipped with navar and tuned to the local control station; "guests" are planes whose navar sets are tuned to another station; and "strangers" are aircraft without navar. At the ground navar station the images of all planes in all three scopes are transmitted through a specially designed projector onto a large map of the area on a wall screen.

In addition to the lateral positions of planes in the area, he continued, the figures on the map representing member planes will show adjacent groups of letters and numbers identifying each plane and telling its altitude. The equipment permitting this feature is based on the IFF (identification—friend or foe) automatic radar method used by aircraft during the war. This IFF equipment answers automatically certain "stock" questions about flying conditions without attention of the crew.

The complete coordinated picture of all aerial activity in the control area is retransmitted by the ground station and picked up by the navar-equipped planes, he further explained. The airborne radar scope is viewed through a translucent map of the control area so that the pilot sees his own and other planes in relation to the ground as well as to each other.

*Science News Letter, February 16, 1946*

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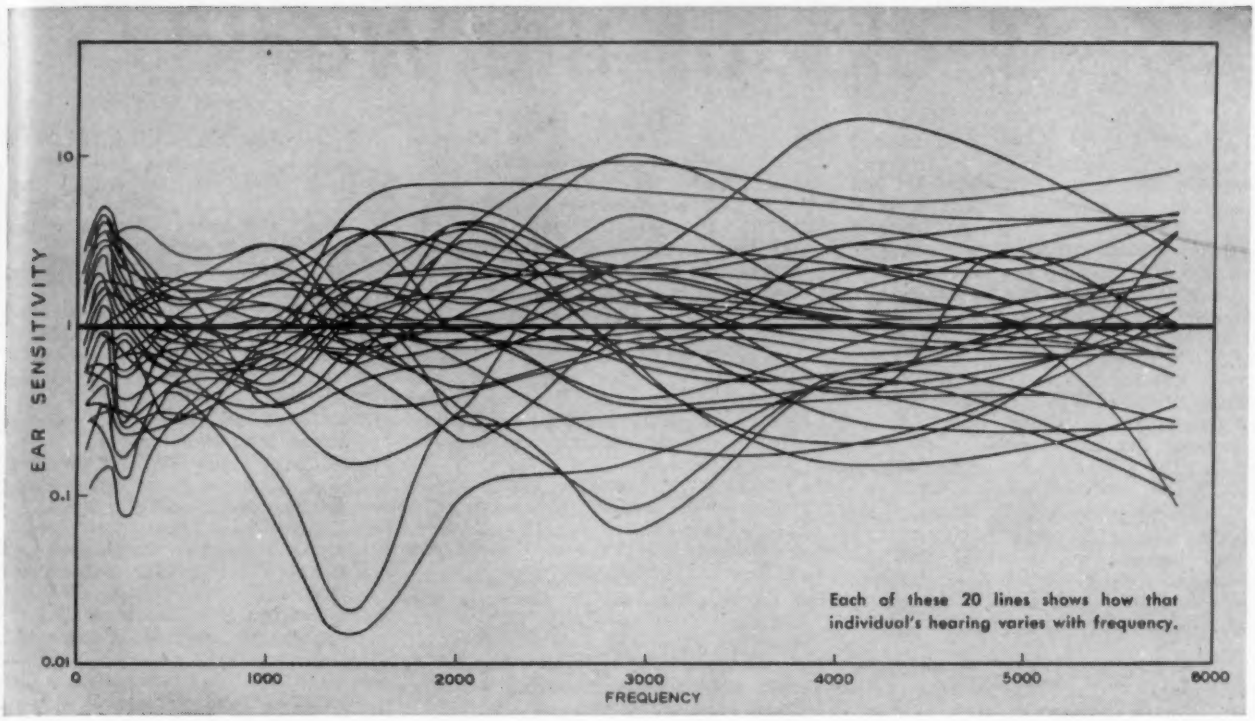



# To measure is to know

Twenty-five years ago, one standard of sound power was the ticking of a watch, another was the clicking of two coins; and the measure was how far away the tick or the click could be heard. That test was made in measuring people's hearing, a field of interest to the Bell System scientists because the ear is the end-point of every talking circuit.

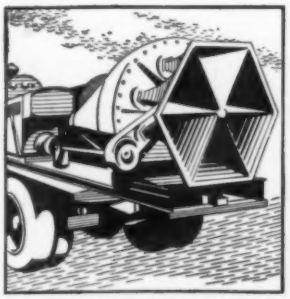
Accustomed to exact measurements, Bell scientists proceeded to develop a method of measuring hearing-sensitivity in terms which could be precisely defined and reproduced. After plotting hundreds of runs like those above, they decided on a particular sound intensity, representing an average "threshold of hearing," as a starting point.

The sounds delivered by a telephone line had previously been evaluated by listeners who compared their loudness with that of a standard source. There were wide variations in ears, as the chart shows, so the engineers replaced them by electrical instruments. When later their associates developed the Western Electric radio and public address systems, the necessary measuring circuits were promptly forthcoming. Addition of a standard microphone made a noise meter, widely used in quieting airplanes and automobiles.

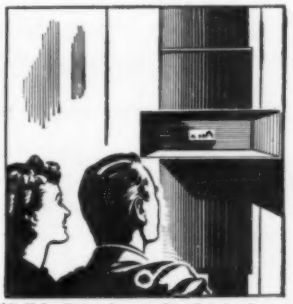
"Through measurement to knowledge," said a famous Netherlands scientist. The principle finds wide application in Bell Laboratories, whether the quest be for a way to measure sound, a new kind of insulation, or more economical telephone service.

Hearing was first measured reliably by engineers in the Bell Telephone Laboratories

For good reception, program loudness must stay within certain limits. Volume-meters help to hold it there



From the throat of this mighty air-raid siren comes the loudest sustained sound ever produced



Visible Speech, result of telephone research, turns sound into "pictures" that the deaf can read

**BELL TELEPHONE LABORATORIES** *Exploring and inventing, devising and perfecting for continued improvements and economies in telephone service*

# • Books of the Week •

ALL AROUND US—Wilbur L. Beauchamp, Gertrude Crampton, William S. Gray—*Scott*, 80 p., illus., $1.08. For use in Grade Two; presents the fundamental concepts of natural science through pictures. Teachers' edition contains many suggestions.

THE AMERICAN EPHEMERIS AND NAUTICAL ALMANAC: for the year 1947—U. S. Naval Observatory—*Government Printing Office*, 630 p., $2.

ANNUAL REPORT OF THE SMITHSONIAN INSTITUTION: 1944—*Government Printing Office*, 503 p., charts, illus., $1.50. Operations and expenditures of the Institution and papers on astronomy, industrial sciences, medicine, etc.

A BIBLIOGRAPHY AND SHORT BIOGRAPHICAL SKETCH OF WILLIAM HEALY DALL—Paul Bartsch, Harald Alfred Rehder, Beulah E. Shields—*Smithsonian Institution*, 96 p., plate, 45 cents. Smithsonian Miscellaneous Collections, Vol. 104, No. 15.

BIRDS OF THE WHITE-FULLER EXPEDITION TO KENYA, EAST AFRICA—Harry C. Oberholser—*Cleveland Museum of Natural History*, 122 p., illus., $1. Scientific Publications of the Cleveland Museum of Natural History, Vol. IV, No. 3.

THE BIRTH AND DEATH OF THE SUN—George Gamow—*Penguin*, 219 p., diagrs. and illus., 25 cents. The intricacies of physics and atomic energy handled with simplicity and clarity; this edition contains a new preface and a special appendix on the atomic bomb.

THE CHALLENGE OF RED CHINA—Gunther Stein—*McGraw*, 490 p., illus., $3.50. An analysis of the aims, problems and achievements of the Communists in China and of the attempts of the U. S. to coordinate relations between the two Chinas.

CLINICAL ELECTROCARDIOGRAPHY — David Scherf and Linn J. Boyd—*Lippincott*, 267 p., illus., $8. 2nd ed. In this revised edition the essential features of electrocardiography are presented for the reader unacquainted with the field.

DEMOCRATIC EDUCATION — Benjamin Fine—*Crowell*, 251 p., $2.50. A report on the fundamental controversy between "aristocratic" education based on the classics, and "democratic" education dealing with contemporary problems; and a plea that colleges teach students to meet practical social problems.

DICTIONARY OF FOREIGN TRADE—Frank Henius—*Prentice-Hall*, 745 p., illus., $10. Concise definitions of foreign trade terms and a detailed explanation of foreign trade practises and procedures.

THE DINOSAUR BOOK: The Ruling Reptiles and Their Relatives—Edwin H. Colbert—*American Museum of Natural History*, 156 p., illus., $2.50. A popular book on the fossil amphibians and reptiles, with particular attention given to the dinosaurs.

THE GOVERNING BOARD OF THE HOSPITAL—*American Hospital Assn.*, 29 p., 20 cents. Discussion of the term of office, organization, responsibilities and training of the governing body of the hospital.

HIGH VACUUM FOR INDUSTRY—*National Research Corp.*, 24 p., charts and illus., free. The methods and accomplishments of Vacuum Engineering Division of National Research Corp. in making high vacuum apparatus available for commercial application.

HOW DO WE KNOW?—Wilbur L. Beauchamp, Gertrude Crampton, William S. Gray—*Scott*, 96 p., illus., $1.24. For use in Grade Three in a picture-method primary science program which includes the study of animals, land and water, plants, wheels and levers. Teachers' edition contains many suggestions.

INSECT DIETARY: An Account of the Food Habits of Insects—Charles T. Brues—*Harvard Univ. Press*, 466 p., illus., $5. The diverse relations of insects to their environment through the medium of their food, the devious ways in which they have exploited the living world in their search for food, and how these activities have guided their evolution.

LONGLEAF PINE—W. G. Wahlenberg—*Charles Lathrop Pack Forestry Foundation*, 429 p., charts and illus., $5. The use, ecology, regeneration, protection, growth, and management of longleaf pine.

MANUAL OF HOT-MIX ASPHALTIC CONCRETE—*Asphalt Institute*, 111 p., charts and diagrs., free. Recommended thickness requirements, methods of testing mixtures, and inspection.

MEASURING THE COMMUNITY FOR A HOSPITAL—*American Hospital Assn.*, 39 p., 25 cents. How to estimate the size of hospital required, and how to plan the building and organization.

MEET THE U. S. A.: Handbook for Foreign Students in the United States—Ching-Kun Yang—*Institute of International Education*, 184 p., illus., 50 cents. Descriptions of the political, economic, social, cultural and industrial phases of American life and detailed information about American colleges and universities.

MEMORANDUM ON THE POSTWAR INTERNATIONAL INFORMATION PROGRAM OF THE UNITED STATES—Dr. Arthur W. Macmahon—*Department of State*, 135 p., 30 cents.

NEW WESTVILLE, PREBLE COUNTY, OHIO, METEORITE—E. P. Henderson and S. H. Perry—*Smithsonian Institution*, 9 p., plates, 15 cents. Smithsonian Miscellaneous Collections, Vol. 104, No. 17.

ORGANIZATION OF THE MEDICAL STAFF OF THE HOSPITAL—*American Hospital Assn.*, 46 p., 20 cents. Discussions of the active staff; the visiting staff, or those who are privileged to use the professional facilities of the hospital; and the consulting staff.

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*Science News Letter, February 16, 1946*

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ECOLOGY

## NATURE RAMBLINGS by Frank Thone

### Winds of Hunger

➤ DISASTER MENACES the millions of cormorants, gulls, pelicans and boobies that are the living foundation of Peru's guano industry, on a group of rocky, arid islands off the coast, declares William Vogt, chief of the Pan American Union's conservation section.

Guano is formed in great quantities on the nesting grounds of these fish-eating sea birds. Every day they fly out to sea to feed, and to bring supplies home to their young. The radius of their feeding flights is limited by their flying speed and the number of daylight hours.

Normally there are plenty of fish, mainly anchovies, within this radius, for the cold, food-rich Humboldt current hugs the shore closely. About one year in seven, however, long-period changes in the prevailing winds cause this current to shift farther out to sea, taking the swarming fish-life with it. The parent birds, to insure their own survival, have to shift with it; and this means leaving the young to starve. This brings about a failure of the guano crop, which in turn causes hardship in the guano-dependent Peruvian agricultural economy.

This is the seventh year since the last seaward shift of the fish that are the raw material for guano, and already signs of trouble are appearing. On some of the islands, bird flocks are reported starting a second nesting period. This Mr. Vogt interprets as meaning that the fishing has turned bad off some of the other islands, and that the birds have deserted their nests there and are trying again on islands nearer to the shifted fishing waters.

*Science News Letter, February 16, 1946*

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*Science News Letter, February 16, 1946*

❁ *PHOTOCOPIES of drawings or manuscripts can be made in a normally lighted room in a new rotary printer which uses green fluorescent tubes. A special paper on which the copies are made is photographically sensitive to green light, but only slightly so to ordinary electric light.*

*Science News Letter, February 16, 1946*

❁ *HANDY HOLDER for hacksaw blades has a tubular handle with an extended grip nose for securing the working point of the blade. The ends of the handle are slotted to receive the inserted blade, and any length blade can be used.*

*Science News Letter, February 16, 1946*

❁ *STEEL STRAPPING made of a special alloy holds together boxes used to drop fragile cargo from airplanes without the use of parachutes. The elastic steel absorbs the shock without breaking. The box, three feet long and one foot square, has a laminated snub nose at each end. Contents are packed in ground paper.*

*Science News Letter, February 16, 1946*

❁ *LOUDSPEAKER, powerful enough to pierce the thunder of battle, has nine receivers and horns mounted on a common panel pivoted on a tripod so that it can be turned up or down, to right or left. Horns, tripod and operator are shown in the picture.*

*Science News Letter, February 16, 1946*

❁ *COFFEE FLOAT, a wire-mesh tube to hold coffee grounds near the surface of the water in the pot, has two air chambers at its ends to furnish buoyancy. The bubbling boiling water agitates the float and its contents, so that the coffee grounds are in constant contact with changing water.*

*Science News Letter, February 16, 1946*

❁ *RAZOR BLADE sharpener, to whet the cutting edges of seven double-edged blades at one time, is a glass jar with nearly vertical sides and a removable cylinder fitted inside on whose outer surface the blades are attached. The cylinder holding the blades is rotated by a knob projecting from its top.*

*Science News Letter, February 16, 1946*

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